

Stardust prepares for comet flight

Sample return mission to launch Feb. 6

Mission controllers are in the final stages of preparation for the launch of JPL's Stardust spacecraft, the first-ever sample return mission to a comet, scheduled for liftoff Feb. 6 at 1:07 p.m. Pacific time from Cape Canaveral Air Station, Fla.

The primary goal of the mission is to collect comet dust and related measurements during a planned close encounter with Comet Wild-2 in January 2004. Additionally, the Stardust spacecraft will bring back samples of interstellar dust particles, recently discovered material streaming into the solar system.

Ground-based analysis of these samples after their return in January 2006 should yield important insights into the evolution of the Sun and planets, and possibly into the origin of life itself. Stardust is being developed under NASA's Discovery Program of low-cost solar system exploration missions with tightly focused science goals.

Stardust's launch window continues through Feb. 25, with one launch opportunity per day.

During the cruise phase, interstellar dust collection will take place between March and May next year and again between July and December 2002, and will be accomplished with ice cube tray-like collectors containing aerogel, the lightest-weight, lowest-mass solid known.

"We will use the back side of the collector to gather interstellar grains that are currently in space," said Principal Investigator Dr. Donald Brownlee of the University of Washington, "while the comet samples will include interstellar grains as well as solar nebular material that

accumulated together 4.6 billion years ago."

Brownlee said "thousands to millions" of tiny particles will be collected, most between a micron (a millionth of a meter or 1/25,000th of an inch) and 100 microns.

At the time of the encounter, Stardust will be about 389 million kilometers (242 million miles) from Earth. The spacecraft will fly between the comet nucleus and the sun, said Project Manager Dr. Ken Atkins of JPL.

"Once we get to comet Wild-2," he said, "we will make a pass within about 150 kilometers (93 miles) of the surface so we can obtain up-close-and-personal pictures" with the spacecraft's navigation camera, which is a combination of adapted spare components left over from previous missions, enhanced by high-tech modern electronics. During distant imaging of the comet's coma, the camera will take pictures through a periscope in order to protect the camera's primary optics as the spacecraft enters the coma.

Other instruments onboard Stardust are a German comet and interstellar dust analyzer, which will intercept and perform instantaneous compositional analysis of dust as it is encountered by the spacecraft, and a dust flux monitor provided by the University of Chicago, which will measure the size and frequency of dust particles in the comet's coma.

On Jan. 15, 2006, the sample-return capsule will be gently parachuted onto the salt flats of the U.S. Air Force's Utah Test and Training



KENNEDY SPACE CENTER PHOTO

Workers in Kennedy Space Center's Payload Hazardous Servicing Facility watch as the Stardust spacecraft is lowered before deploying panels for tests earlier this month.

Range. Samples will be analyzed at a Johnson Space Center curatorial facility.

"The scientific goal of Stardust," Brownlee added, "is to collect the building blocks of planets, not only in our solar system, but also from other planetary systems, and put them under the microscope or other instruments where we can study the samples at phenomenal resolution, down to single-atom scale."

Tom Duxbury of JPL is Stardust mission director. Dr. Peter Tsou is deputy principal investigator. □

Year 2000: no problem

By LINDA DAVIS
ICIS chief technical writer

What do you imagine will be happening at JPL a year from now? Do you picture your computer up and running, the Mars missions continuing on schedule? Or do you see society (and JPL) at a standstill because of computer malfunctions caused by the year 2000? Although the

Y2K Project foresees business as usual at JPL a year from now

Year 2000 (Y2K) problem elicits doomsday predictions from many, JPL's Y2K Project members foresee business as usual at JPL a year from now.

What is the Y2K problem?

Since the 1960s, dates have been programmed in computer hardware systems and software programs by using only the last two digits of a year. For example, 1966 is entered as 66. When Windows and DOS PCs encounter 2000 in a date (in either hardware or software),

their Basic Input Output System (BIOS) may read 00 as 1900. If this happens, PCs may malfunction. (Macintosh computer hardware is not subject to the Y2K problem; Mac software is.)

The Y2K problem does not spell doom for the world's PCs. It can be solved by testing and, if necessary, repairing the BIOS. This renders a PC Y2K "compliant." Software applications can also be tested and, if necessary, repaired with a software "patch" or replaced. The biggest Y2K problem lies in the fact that many organizations with large numbers of PCs have not recognized the problem soon enough to solve it by 2000.

NASA, on the other hand, established its Year 2000 Project several years ago and, due to time

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Agency issues technology development challenge

Program seeks to meet needs across NASA disciplines

By Dr. EUGENE TRINH
Senior research scientist

The exciting and challenging array of future missions for science, deep-space probing, robotic and human exploration envisioned by NASA requires the development and validation of radically new technologies in order to accommodate the demanding scientific, engineering and limited-cost requirements.

In response to the inter-disciplinary nature of this endeavor, NASA has introduced a cross-enterprise technology development program, aiming to integrate the diverse agency-wide future technical requirements and to maximize the potential for synergistic benefit.

The program serves four primary customers: the Earth Science Enterprise, the Human Exploration and Development of Space Enterprise, the Space Science Enterprise and

the Office of the Chief Technologist's strategic technology areas. Cross-enterprise technology is defined as long-range strategic technologies that have broad potential to span the needs of more than one enterprise.

While concerned with primary mission-oriented needs, the program will also address high-risk controversial technologies that could potentially revolutionize NASA by introducing long-term, controversial, high-

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Special Events Calendar

Ongoing

Alcoholics Anonymous—Meeting at 11:30 a.m. Mondays, Tuesdays, Thursdays (women only) and Fridays. Call Occupational Health Services at ext. 4-3319.

Codependents Anonymous—Meeting at noon every Wednesday. Call Occupational Health Services at ext. 4-3319.

Gay, Lesbian and Bisexual Support Group—Meets the first and third Fridays of the month at noon in Building 111-117. Call employee assistance counselor Cynthia Cooper at ext. 4-3680 or Randy Herrera at ext. 3-0664.

Parent Support Group—Meets the fourth Tuesday of the month at noon. Call Jayne Dutra at ext. 4-6948.

Senior Caregivers Support Group—Meets the second and fourth Wednesdays of the month at 6:30 p.m. at the Senior Care Network, 837 S. Fair Oaks Ave., Pasadena, conference room #1. Call (626) 397-3110.

Friday, January 22

"Adventure Along the U.S.-Canadian Border"—This travel film will be presented at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$9 and \$7. For information, call (626) 395-4652.

Award for Excellence Nominations—Due today from JPL personnel in business operations organizations (1X, 19X, 2X and 6X) to the Reward & Recognition Administrator. Visit the R&R home page at <http://eis/sec614/reward/excel.htm> or call ext. 4-3825.

JPL Dance Club—Meeting at noon in Building 300-217.

Von Kármán Lecture Series—Origins Program Manager Dr. Firouz Naderi will speak at 7 p.m. in The Forum at Pasadena City College, 1570 E. Colorado Blvd. Open to the public.

Saturday, January 23

Caltech Jazz Bands—A free concert featuring swing music will be held at 8 p.m. in Beckman Auditorium. Admission is free. For information, call (626) 395-4652.

Wednesday, January 27

Investment Advice—Fidelity Investments will present two workshops in the Building 167 cafeteria. "Basics of Investing" will be held at 10 a.m., while "Asset Allocation" is set for 2 p.m. Seating will be limited.

JPL Drama Club—Meeting at noon in Building 301-127.

JPL Library Orientation Session—Employees, especially new hires, are invited to the library lobby, Building 111-104, at 11:30 a.m. The primary information resource at JPL, the library provides hard copy and web-based information to end users. Each session takes 30 minutes or less and includes a tour of library facilities as well as familiarization with the many reference resources available.

JPL Toastmasters Club—Meeting at 5:30 p.m. in the Building 167 conference room. Guests welcome. Call Mary Sue O'Brien at ext. 4-5090.

Russian Language Workshop—Meets from 7 to 9 p.m. on the

Caltech campus. Some knowledge or previous study of the language is essential. For location and further information, call Joyce Wolf at ext. 4-7361.

Thursday, January 28

Caltech Architectural Tour—The Caltech Women's Club presents this free service, which is open to the public. The tour begins at 11 a.m. and lasts about 1 1/2 hours. Meet at the Athenaeum front hall, 551 S. Hill, Pasadena. For information and reservations, call Susan Lee at (626) 395-6327.

JPL Golf Club—Meeting at noon in Building 306-302.

Friday, January 29

JPL Dance Club—Meeting at noon in Building 300-217.

Saturday, January 30

Kol Simcha—This European ensemble will perform Yiddish music at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$25, \$21 and \$17. For information, call (626) 395-4652.

Tuesday, February 2

JPL Gamers Club—Meeting at noon in Building 301-227.

JPL Genealogy Club—Meeting at noon in Building 301-169.

Wednesday, February 3

JPL Bicycle Club—Meeting at noon in the Building 167 conference room.

JPL Drama Club—Meeting at noon in Building 301-127.

Russian Language Workshop—Meets from 7 to 9 p.m. on the Caltech campus. Some knowledge or previous study of the language is essential. For location and further information, call Joyce Wolf at ext. 4-7361.

Thursday, February 4

JPL Gun Club—Meeting at noon in Building 183-328.

SESPD Lecture—Yi Chao of Element 3237 will discuss "Climate Ocean Modeling and Satellite Oceanography" at 11 a.m. in von Kármán Auditorium.

"Why People Believe Weird Things: Pseudoscience, Superstition and Other Confusions of Our Time"—Dr. Michael Shermer, adjunct professor, history of science, Occidental College, will speak at 4:45 p.m. in von Kármán Auditorium (presentation followed by book signing). Sponsored by the Caltech Management Association.

Friday, February 5

Associated Retirees of JPL/Caltech Board—Meeting at 10 a.m. at the JPL Woodbury complex, conference room 601-224, 500 W. Woodbury Rd., Altadena.

JPL Dance Club—Meeting at noon in Building 300-217.

"The Comedy of Errors"—Shakespeare's classic is revisited by Aquila Theatre of London at 8 p.m. in Caltech's Beckman Auditorium. Tickets are \$29, \$25 and \$21. For information, call (626) 395-4652.

Earth missions would study clouds, aerosols, volcanic plumes

JPL will manage and develop payload for CloudSat, an alternate ESSP mission

By MARY HARDIN

NASA has chosen to develop three small satellite missions designed to explore the Earth's dynamic systems under its Earth System Science Pathfinders (ESSP) program, one of which will be managed by JPL.

JPL will provide mission management and payload development for CloudSat, an Earth-orbiting radar that was chosen as one of two alternate missions. The principal investigator for CloudSat is Dr. Graeme Stephens of Colorado State University.

CloudSat is a mission focused on understanding the role that thick clouds play in the Earth's radiation budget—a balance of solar energy reaching the Earth and lost to space that ultimately controls the temperature of the Earth. CloudSat would use an advanced cloud-profiling radar to provide information on the vertical structure of highly dynamic tropical cloud systems. This new radar would enable measurements of cloud properties for the first time on a global basis, revolutionizing our understanding of cloud-related issues. CloudSat would launch in 2003.

CloudSat will fill a significant gap in the existing and planned Earth observation missions by measuring the vertical profile of clouds

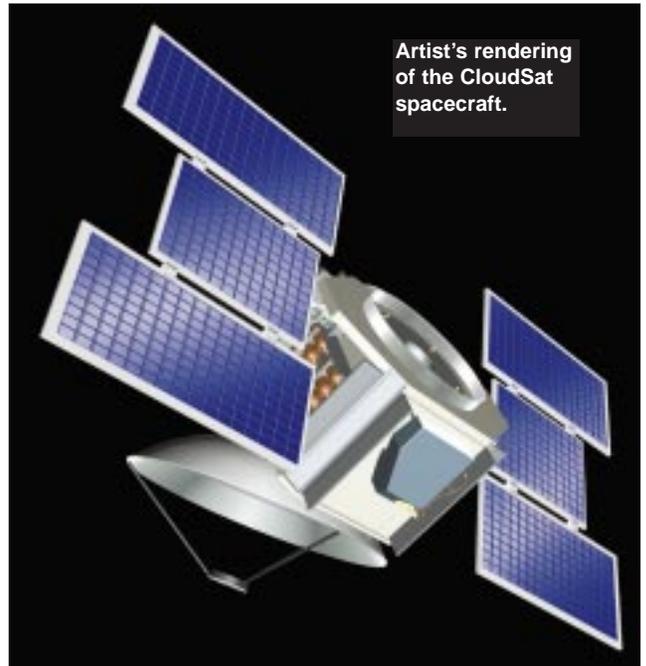
using active remote sensing (94-GHz radar) and a profiling oxygen A-band spectrometer/imager. CloudSat information will be enhanced by formation flying with the IceSat lidar, a NASA ice and cloud mission set to launch in 2001.

The estimated mission cost of CloudSat would be \$144.6 million, with NASA contributing \$119.6 million. Collaboration with Canada is being explored for the provision of critical components for CloudSat's cloud-profiling radar.

In addition to CloudSat, NASA has chosen one additional concept, the Volcanic Ash Mission (Volcam), as an alternate mission. Volcam would monitor volcanic clouds and aerosols from a geostationary orbit. CloudSat and Volcam will go through an extended development and technology assessment before NASA selects one as a primary mission and one as an alternate.

At the same time, NASA selected the Pathfinder Instruments for Cloud and Aerosol Spaceborne Observations-Climatologie Etendue des Nuages et des Aerosols, or Picasso-Cena mission, for development as a primary mission. Picasso-Cena, led by NASA's Langley Research Center, Hampton, Va., will fly instruments designed to address the role of clouds and small atmospheric particles known as aerosols and their impact on Earth's radiation budget.

These missions join NASA's two current ESSP missions, the Vegetation Canopy Lidar, which will launch in 2000, and the JPL-managed Gravity Recovery and Climate Experiment (GRACE), which will launch in 2001. The VCL mission will provide the first



Artist's rendering of the CloudSat spacecraft.

global inventory of the vertical structure of forests across Earth using a multi-beam laser device. GRACE employs a satellite-to-satellite microwave tracking system between the two satellites to measure the Earth's gravity field and its time variability over five years.

The philosophy of the ESSP program is to achieve maximum science value while complementing existing or planned flight missions. The principal investigator is responsible for developing the flight mission hardware from selection to a launch-ready condition within 36 months, with minimal direct NASA oversight. The principal investigator and mission team are responsible for accomplishing the stated scientific objectives and delivering resulting data to the broader Earth science community and general public as expeditiously as possible. □

Stone emphasizes importance of JPL's ISO 9001 effort

JPL is rapidly headed toward its ISO 9001 registration audit at the end of March. JPL Director Dr. Edward Stone provided context for the ISO effort in a recent meeting with group supervisors in von Kármán Auditorium. The text of that Dec. 7, 1998 meeting is offered here for Lab personnel.

As you all know, for the last six years there has been a real emphasis in Washington on reinventing government. That's an emphasis both in the administration and in the Congress. The emphasis has been on adopting the best business practices of private industry in government.

Under Dan Goldin, NASA is actually recognized as one of the leading, if not the leading agency, in reinventing itself in government. And within NASA, JPL is widely recognized as leading that change within the agency.

It's very clear to me that the fact that the agency took the step of reinventing itself has contributed to the stabilization of the NASA budget over the last several years. It has certainly contributed to the growth within the NASA budget of the space science part of the budget.

In fact, just last week the NASA Advisory Council spent two days here in one of their meetings. They went away very impressed with what they saw at the Laboratory, and the way that we have put together the space program for the third era of exploration.

ISO 9000 is one of those best practices from the private sector. It's not a new program at all. It's been around for at least a decade, and is now a well-established best practice. And the administrator, Dan Goldin, has committed the agency to again lead the way within the government

with respect to ISO 9000.

Now, in this case, this time, we're not in the lead. Johnson Space Center, Kennedy Space Center and Marshall Space Flight Center have all been certified for six to 10 months, since their earliest audits were last February. And, in fact, Kennedy is undergoing its periodic audit, its follow-up audit, this week. The aeronautics and simulation part of the Ames Research Center activity has also been certified. So, in this particular case, we are not in the lead.

Our registration date is March 29, 1999, and we have a lot to do between now and then.

ISO 9000 is a framework for how we work and the certification audit looks for evidence of that framework. That framework is very simple. It says to document what you're going to do, do what you say you're going to do in your

documents, and then verify it. And the audit is about where the documents are, are you following the documents, and how do you verify that you have followed those documents. It's up to us what those documents are. But the audit's purpose is to look to see that we have those three pieces, that framework.

Having such a framework is not new for the Laboratory. The big missions did this for the Laboratory every seven to 10 years. One of my earliest recollections from the Voyager mission back in the early '70s was during the first year there was a tremendous effort spent Laboratory-wide getting the documentation up to date, so that there was a Voyager set of documents about how that mission was going to be built.

And that was based on taking

See ISO, page 6

O'Neil to manage Mars sample return missions

William O'Neil, who served as project manager of JPL's Galileo mission to Jupiter from 1990 to 1998, has been named manager of NASA's first two Mars sample return missions, scheduled for launches in 2003 and 2005.

O'Neil, who was appointed in mid-November, served as chief technologist for the Mars Exploration Program in the interim, overseeing all aspects of technology development and implementation for NASA's long-range program of robotic exploration of Mars. This past summer he played a key role in the comprehensive effort at JPL to redesign the architecture of the Mars sample return missions to determine the best approach for these first-ever missions.

Before serving as Galileo project manager, he was Galileo's science and mission design manager during the spacecraft's development phase.

In the mid-1960s, O'Neil worked as a trajectory design



William O'Neil

and navigation engineer for the Lunar Surveyor project, the first robotic spacecraft to soft-land on the surface of the moon. He also served as navigation chief on the 1971 Mariner mission to Mars, the first U.S. spacecraft to orbit another plan-

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Cook new MSOP manager

Richard Cook, who served as flight operations manager for 1997's Mars Pathfinder lander and rover mission, has been named manager of the Mars Surveyor Operations Project.

Cook replaces Glenn Cunningham, who was recently appointed deputy director of the Mars Exploration Directorate.

Cook will assume the hands-on role of daily management of flight operations for missions, including the three spacecraft currently en route to or in orbit around Mars. His responsibilities include activities such as orchestrating spacecraft tracking, telecommunications operations and data collection among multiple spacecraft that will be conducting their primary science missions concurrently.

He will also manage flight operations planning for future Mars missions, including the 2001 Mars mission and the 2003 and 2005 Mars sample return missions.

Joining JPL in 1989, Cook worked on the Magellan mission to Venus and helped plan concepts for projects to Mars and the moon before joining the Mars Pathfinder Project in 1992 as a mission designer.

Cook earned a bachelor's degree in engineering physics in 1987 from the University of Colorado and a master of science degree in aerospace engineering in 1989 from the University of Texas. He is the recipient of a NASA Outstanding Leadership Medal for his work on Pathfinder. □



Richard Cook

Wilson named CSMT manager, chief technologist

Dr. Barbara Wilson has been named program manager for the Center for Space Microelectronics Technology at JPL. She will also serve as the Lab's chief technologist.

The Center for Space Microelectronics Technology was founded in 1987 to develop high-risk, high-payoff concepts and devices to enable future space missions and to enhance current and planned missions. The center conducts research and development in such fields as solid-state devices, photonics, custom micro-circuits and advanced computing.



See Wilson, page 5 Dr. Barbara Wilson

Technology

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payoff technologies.

In addition, an effort is made to leverage off the entire nation's scientific and engineering capabilities by offering specific research funding opportunities to industrial, academics and other non-NASA government institutions for competition.

Not only will this approach offer the chance for the entire research community to participate in our space exploration efforts, but it will also provide NASA technologists with the unique opportunity to integrate innovations and advanced capabilities through collaborative efforts with the best and most forward-looking institutions in the world.

In the near term, the release of a NASA research announcement is planned for early 1999 through the Office of Space Science to solicit advanced technology development targeting future NASA missions. Nine specific technology areas are to be emphasized in this initial release:

- Spacecraft technology development for advanced power and on-board propulsion;
- Development of "breakthrough" technology sensors and instrument components;
- New distributed spacecraft control architectures, methodologies and hardware components;
- Flight- and ground-based systems for high-rate knowledge delivery;
- Intelligent systems for autonomous control;
- Technology for micro/nano sciencecrafts;
- Next-generation infrastructure for radically new design, development and execution of NASA missions;
- Systems for in-situ extraterrestri-

al surface exploration and utilization;

- Technology for ultra-lightweight space structures and observatories.

Total funding of approximately \$10 million per year for three years will be provided to sponsor the winning proposals in the form of three-year tasks at the \$150,000 to \$500,000 per year level.

Subsequent research announcements will be issued to bring the total number of research projects to a steady level after the initial three years. The first will be targeted toward industrial, academic and non-NASA federal institutions.

Although JPL scientists and technologists will not be involved as principal or co-investigators in the initial research announcement, they will participate as collaborators and in supporting roles on a cost reimbursable basis. This would, therefore, provide an opportunity to establish new working relationships that could mature into efficient and synergistic joint research, leading to JPL-led tasks in response to future research announcements.

The expected final research announcement release is tentatively projected to be in February 1999, with the proposal due date in April 1999.

The Technology and Applications Programs Directorate is coordinating the activities at JPL for these cross-enterprise technology research announcements by providing information, a centralized database of all potential JPL-based collaborative efforts and future proposals, and limited levels of bids and proposals funding.

It is expected that all JPL researchers and engineers will be contributing to this important initiative which will impact the very foundation of JPL goals. The first-level contact for research-announcement coordination at JPL is Dr. Eugene Trinh in Section 354. □

AVIRIS helps study Georges damage

Scientists studying the aftermath of Hurricane Georges on coastal areas in Louisiana are using NASA images to help them understand where sand moved and how vegetation was impacted by salt water on two coastal barrier islands and the Atchafalaya River Delta.

Scientists are particularly interested in images of the Chandeleur Island chain because of the severe damage caused by Hurricane Georges in October 1998.

The images were gathered Oct. 28 by JPL's Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) onboard a National Oceanic and Atmospheric Administration (NOAA) plane. The instrument measures 224 spectral channels, which means it can give scientists a highly detailed look at what is happening on the surface in ways that are invisible to the naked eye.

"The damage from Hurricane Georges on the Chandeleurs Islands was as bad as that of Hurricane

Camille almost 30 years ago," said Dr. Shea Penland, a scientist at the University of New Orleans. "Having the chance to use imagery from the AVIRIS scanner gives us a great opportunity to understand the full extent of the hurricane's damage and look at ways to deal with the damage. The AVIRIS data are so rich in imagery and the resolution is so good that we have for the first time the ability to completely characterize the landcover on Louisiana's barrier islands."

"Imaging spectroscopy is a technique that represents a fundamental new way of doing remote sensing," said Robert Green, the AVIRIS experiment scientist at JPL. "We are measuring in detail how light is absorbed or reflected by various materials on Earth's surface and that gives us an accurate picture of what those materials on the ground are made of and how the surface is changing."

NOAA and university scientists believe they will be able to

use the imagery to study Louisiana's coastal wetlands, such as the Chandeleurs Islands, to gain a much better understanding of how they function and react to outside forces such as storms. The university, NOAA and JPL will also be offering the data to other scientists conducting coastal habitat research on a wide variety of issues, including marine fish habitat conservation and coastal wetlands restoration.

People who live on or near the Louisiana bayous protected by these barrier islands, along with those who make their living from the bountiful natural resources of the Mississippi delta, will be the ultimate beneficiaries of the information that is expected to be learned from this extensive data.

The University of New Orleans will receive the AVIRIS imagery from NOAA and JPL and will serve as a technical information center in the analysis of the storm's impact on the Chandeleur Island

Spectroscopy is focus of AVIRIS Feb. workshop

A one-day introductory course on imaging spectroscopy will be offered to scientists during the AVIRIS Earth Science and Applications Workshop at JPL on Feb. 8 in von Kármán Auditorium.

AVIRIS is a unique airborne optical instrument that is used to identify, measure and monitor constituents of the Earth's surface and atmosphere based on how the surface absorbs or scatters molecules.

For information, access the AVIRIS web site at <http://makalu.jpl.nasa.gov>. □

chain. The public can also view some of the imagery on the Internet at <http://makalu.jpl.nasa.gov> (click on "AVIRIS Low Altitude Deployment" and look for images of Chandeleur, Timbalier and Atchafalaya Bay on the "Quicklook Index"). □

TOPEX/Poseidon autonomous navigation experiment a success

By MARY HARDIN

In an experiment that could change the way satellites are flown in Earth orbit, the U.S./French TOPEX/Poseidon satellite has successfully completed the first-ever NASA autonomous navigational maneuver.

The experiment, which was designed to help validate technology that allows Earth-orbiting satellites to autonomously adjust their orbits, was conducted in early December from the TOPEX/Poseidon mission control room at JPL.

"The importance of this maneuver lies in the fact that it provides confidence that autonomous satellite actions can be affordably

developed and executed at an acceptable level of risk," said Charles Yamarone, program manager of JPL's Earth Science Flight Projects Office. "It is the first step in demonstrating a complete autonomous navigation system for Earth-orbiting satellites."

In the experiment, flight controllers uplinked software to TOPEX/Poseidon that autonomously planned the satellite's actions and generated a series of commands to steer it. The software required minimal input from ground controllers, consisting only of changes in velocity and the time to execute the maneuver. The software then computed the changes in satellite orientation and the amount and timing

of satellite thruster burns with no further input from ground controllers.

TOPEX/Poseidon was selected for this experiment because it is an operational satellite that needs to precisely maintain its ground track. It also has an onboard computer that could be used for the experiment without interrupting or jeopardizing satellite normal operations. This computer is part of the experimental global positioning system receiver that is normally used for precision orbit determination.

NASA's first mission planned to test completely autonomous navigation is the New Millennium Program's Earth Orbiter 1, planned for launch in late 1999 or early 2000. □

Wilson

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Wilson succeeds Dr. Carl Kukkonen, who left JPL last fall to head a new company, ViaSpace Technologies LLC of Pasadena. As JPL's chief technologist, Wilson's office will provide strategic leadership and integration for all aspects of technology development throughout JPL. Both positions are effective Feb. 11.

A physicist with a doctorate from the University of Wisconsin-Madison and a bachelor's degree from Mount Holyoke College in Massachusetts, Wilson joined JPL in 1988 as technical group supervisor of the

Microdevices Section. Shortly thereafter she was named manager of the Microdevices Laboratory, a facility operating under the CSMT umbrella.

She most recently served as program manager for JPL's Earth Science Program Office and technologist for the New Millennium Program. She is the recipient of the NASA Special Achievement Medal for her contributions to New Millennium.

Before joining JPL, she served as supervisor of the Opto-electronic Materials Research Group at AT&T Bell Labs, where she was awarded the company's exceptional contribution award for her work in semiconductor devices. □

O'Neil

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et, and navigation chief for the Viking mission to perform the first soft landings on Mars.

O'Neil earned his bachelor's degree with distinction in aeronautical engineering in 1961 from Indiana's Purdue University and his master's degree in aerospace engineering in 1967 from USC.

He is the recipient of NASA's highest award, the Distinguished Service Medal, and Purdue's Distinguished Alumni Award. He also holds an honorary doctorate from the University of Padova, Italy, home of the Galileo spacecraft's namesake, 16th century astronomer Galileo Galilei. □

Passings

Milton Brockman, 80, a retired engineer from Section 330, died of cancer Nov. 27 at his Carlsbad home.

Brockman worked at JPL from 1955-85. He is survived by his wife, Jean, daughter Suzanne and son Jefferey. Funeral was private. □

Thomas Loesch, 53, a software engineer in Section 345, died of cancer Dec. 4 at Verdugo Hills Hospital in Glendale.

Loesch had been with JPL since 1978. He is survived by his daughter, Dawn, and son Eric. □

Peter Balzer, 91, a retired senior guard from the former Section 123, died of natural causes Dec. 10 at an Illinois nursing home.

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Y2K

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pressure and scrutiny from Congress and the federal government, has given it priority status. NASA is systematically following the General Accounting Office (GAO) five-phase (awareness, assessment, repair, testing and implementation) Year 2000 Conversion Model. JPL is doing the same.

Y2K progress on Lab

The Laboratory's assessment phase (inspection and inventory of items needing repair) is complete. Most system software and hardware components (JPL-developed and commercial) have been checked for possible malfunction. This process involved combing through millions of lines of code. Everything from antennas to elevators to business systems was checked. (An exception is desktop computers. While desktop computers and software have been assessed as a class, not every desktop computer at JPL has been tested yet. See below for users' responsibility in this area.)

During the past year, most (more than 160) applications and other deliverables were either replaced or repaired in order to eliminate Y2K problems. Some results include:

- The high efficiency antennas at Goldstone; Canberra, Australia and Madrid, Spain were equipped with the new microwave configuration control group, a Y2K-compliant design originally developed for the beam waveguide antennas.
- Routers in the Mars Surveyor program were upgraded to ensure Y2K compliance.
- The former JPL business system mainframe software was replaced by a Y2K-compliant Oracle Applications suite.

Status and compliance information on hardware, software, embedded systems and commercial-off-the-shelf (COTS) products in use across the entire Lab are now centralized online in what is known as the "JPL Y2K Database."

During the last quarter of 1998, focus shifted from inventory and repair to testing repairs that had been done. This is the most expensive part of solving the Y2K problem. Although searching through code was a huge task, it was successfully automated to a large extent with YDC, the tool developed by JPL for this purpose. Testing is more labor-intensive. It requires setting up systems that simulate operational systems, but are used solely for the purpose of Y2K testing. JPL

is working toward NASA's deadlines of Jan. 31 for completion of testing and Feb. 28 for reinstallation of software components.

The Y2K Project also began developing contingency plans to provide JPL with a systematic approach to unknowns that may arise. NASA expects JPL to finalize these plans by March 31, 1999.

What still needs to be done at JPL?

"JPL's Y2K Project appears to be on track; NASA is pleased with the progress so far," said Dick Mathison, Y2K project manager. But there is still much to do. Testing and reinstalling software, and contingency plans, must be completed, along with testing the plans and training personnel for emergency scenarios. Desktop PCs must all be tested and test failures addressed.

"The Y2K Project continues to monitor commercial software in use at the Lab," said Dr. Robert L. Miller, the project's engineering manager. "It is imperative that Y2K-compliant COTS updates be obtained and implemented. Desktop software for both Mac and PC must be assessed and, if necessary, replaced or patched."

Individual users responsible

"Because the schedule for accomplishing the Year 2000 project's goals

is so tight, the Y2K Project Team requests the cooperation of everyone at the Lab," said Tim Scheck, project control and communications manager. "Each directorate is responsible for the compliance of their hardware, software and embedded elements. Supervisors should ensure that their employees are taking appropriate action."

Each user should take the initiative to check his or her own PCs, or have them checked, so JPL can report full compliance by the end of February, he said. Users of both Macs and PCs must also ensure that their software is Y2K compliant.

The OAODNS Alliance web site (<http://alliance.jpl.nasa.gov>) provides software employees can download to test the BIOS of PCs running Windows (95, NT, 3.1x and Windows for Workgroups). (Note: Advancing the clock on your PC is not a good way to test it. This can cause more problems.) You can run the test yourself or call the DNS Support Center (4-HELP) for help with testing. Depending on the test results, follow the instructions on the testing site, which includes a contingency plan for PCs that fail the test. Basically, here's what to do:

If your PC hardware is compli-

ant, remember that your software must also be compliant (see below).

Call 4-HELP for assistance if your PC is not Y2K compliant or if the test won't run on your computer. If the computer is older than 18 months, it must be replenished (replaced).

If your PC is not subscribed with OAODNS, you will be charged on a per-event basis.

OAODNS is responsible for the Y2K compliance of JPL core software. Individual users are responsible for compliance of other software they use (on either a PC or a Mac). Check the COTS database (see below) or the software vendor's Web site for Y2K information on these products.

Where to find more information

The online Y2K Project library home page offers links to pertinent Y2K documents. Access it via the "General Computing" section of the icis home page (<http://icis.jpl.nasa.gov>). From there, you can connect to policies and requirements, the JPL year 2000 database (and from there to the COTS database) and the NASA Y2K web site. Also check the January/February 1998 CIS News (in "News & Events" on the ICIS home page) for previous articles on the Y2K issue at JPL. □

ISO

Continued from page 3

old Viking orbiter documents and bringing them up to date. I could well imagine Galileo did the same when they began back in the late '70s. I suspect Cassini may well have done the same thing again. So every seven to 10 years the big missions did ISO 9000-like frameworking for the Laboratory.

What's changed, of course, is we're now in the third era of exploration, where our challenge is getting there often and getting back. We have a lot of small missions, rather than an occasional big mission. And there is no big mission to provide this framework for us anymore.

We had realized that in this transition from the second era with big missions to the third era, there were a lot of changes in our infrastructure that were going to be affected, because the big missions provided so much of the infrastructure for the Laboratory. But this particular aspect of the framework for our documentation, I think almost all of us overlooked. We just hadn't recognized that that was going to be a missing element.

And as a result, the documentation is slowly but surely getting out of date. And as the recent pre-audit showed, in fact we're not always following it with the precision that we would have back in the second era. So it's been clear to me that we need ISO 9000 to assure the success of the dozens of small projects we are committed to delivering in the decade ahead. Because ISO 9000 is about restoring the framework that the big projects used to provide, and that we hadn't noticed we were losing.

Of course we should have noticed that. We should have recognized this earlier, and then we could have better planned the timing of this whole activity, rather than just responding to an externally mandated schedule. But unfortunately we did not recognize it, so I want to apologize to all of you for the impact this activity has had, and will have on you, at one of the busiest times the Laboratory has ever had.

But unfortunately there's nothing we can do about it; we're where we are. We obviously have to launch our six launches; the third era is here. We are launching six spacecraft in six months. NBS,

the New Business Solutions system, is here, and we are struggling and need to master the new processes to use that new business system. Unfortunately we can't delay that. And I'm sure each of you has a list of other must-do's that just can't be delayed in the next three or four months. That is just the challenge we have.

There is no doubt the next six months will be very challenging. But with your help and focus on what we really need to do to be ready for ISO 9000, it is all feasible. □

For more information on the upcoming ISO audit, go online to <http://iso/march/march.html>.

Retirees

The following employees retired in January:

Fraser Draper, 37 years, Section 620; **Clyde King**, 36 years, Section 352; **George Morris Jr.**, 33 years, Section 333; **Fred Miller**, 30 years, Section 920; **Robert Somoano**, 30 years, Section 875; **Gerald Herriott**, 20 years, Section 357; **Wilson Watkins**, 13 years, Section 344. □

News Briefs

Dr. John Huang of the Spacecraft Telecommunications Equipment Section 336 has been elected a fellow of the Institute of Electrical and Electronics Engineers (IEEE), the world's largest technical professional society.

Huang, a lecturer and recognized authority in the microstrip antenna field, was honored for his contributions to the development of micro-strip antennas for spacecraft and ground mobile applications. □



Dr. John Huang

The winners of JPL's Notable Organizational Value-Added (NOVA) awards for December have been announced:

Section 312: Shyamkumar Bhaskaran, George Carlisle, Louis D'Amario, Gregory Dube, Scott Fullner, Dongsuk Han, Jeremy Jones, Brian Kennedy, Timothy McElrath, Raymond Solomon, Tseng-Chan Wang, Robert Werner, Steven Williams.

Section 333: Farrokh Baher, Paula Brown, Chau Buu, Wodek Gawronski, Jan Loreman, Leslie Manalo, Sharon Miller, Yakov Vodonos,

Susan Welch, Paul Willis.

Section 335: Shailen Desai.

Section 391: Daniel Hurley.

Section 393: Lonny Ching. □

The Director's Advisory Council for Women (ACW) currently has two openings for new members.

Appointed by Laboratory Director **Dr. Edward Stone**, the volunteer council works in an advisory capacity to the director regarding issues as they relate to women JPL employees.

Those interested should contact the ACW at ext. 4-8533, write to mail stop 241-107 or e-mail to ACW@jpl.nasa.gov. □

William Lynch III of the Transportation/Distribution Group in Section 643 was recently recognized with the naming of an asteroid in his honor.

JPL astronomer **Eleanor Helin**, who discovered the asteroid in September 1991, presented the honor to Lynch, a 16-year JPL employee.

Lynch was recognized "based on his outstanding model of efficiency, friendliness and

dedication to his work and responsibilities," according to his supervisor, **Michael Nieto**. "Bill is the epitome of the NASA/JPL 'faster, better, cheaper' motto, in the sense that anyone who works in a highly charged, positive fashion, streamlined for action, leads to a more successful and economical operation.

"Always with a big smile and a cheerful greeting, he is one of JPL's biggest assets," Nieto added. □



William Lynch III of Section 643, left, along with astronomer Eleanor Helin and JPL Chief Scientist Dr. Moustafa Chahine. An asteroid discovered by Helin was recently named in Lynch's honor.

Passings

Continued from page 5

Balzer worked at the Laboratory from 1959-75. He is survived by sons John and Patrick.

Services were held Dec. 12 in Leves Park, Ill. □

Jay Dettinger, 61, retired project element manager in Section 3501, died of cancer Dec. 14 at his home in La Cañada.

Dettinger joined the Lab in 1977 and retired in 1996 as element manager of the Mars Pathfinder propulsion system. He is survived by his wife, Elisabeth, and son John.

Cremation services were held Jan. 7 at Forest Lawn in Glendale. □

Raymond Tripp, 76, a retired senior engineer from Section 661, died of stroke Dec. 18 at a rehabilitation center.

Tripp, who worked at JPL from 1978-81, is survived by his wife, Voneta, six children, 20 grandchildren and two great grandchildren.

Memorial services were held Dec. 22 in Sun City, Calif. □

William "Curt" Carr Jr., 48, supervisor of the Science Data Management Group in Section 389, died of cancer Dec. 25 at his home in Claremont.

Carr had been with JPL since 1984. He is survived by his wife, Linda Mason Carr, and daughters Lindsey and Ashley.

Services were held Jan. 6 at Oak Park Cemetery in Claremont. □

Mitchell Shellman, 48, a project element manager in Section 346, died of heart failure Dec. 28 at his home in Covina.

Shellman co-authored the successful proposal for the Mars Environmental Compatibility Assessment Project, a set of instruments on the Mars 2001 Lander that will investigate hazards on the surface of Mars that could effect human exploration of the planet. He was project element manager for MECA's sensors, sampling systems and resource management.

Shellman had worked at JPL since 1990. He is survived by his

wife, Janet, daughter Kimberly and son Scott.

Burial was at Queen of Heaven Cemetery in Rowland Heights. A JPL memorial service was held Jan. 15.

The family has asked that donations in Shellman's memory be made to an education fund for his children and can be sent to Mrs. Janet Shellman at 868 N. Edenfield, Covina, CA 91723. □

Lida Bates, 74, a retired senior engineering assistant from the former Section 230, died of stroke Dec. 30 at Saddleback Memorial Hospital.

Bates joined JPL in 1961 and retired in 1986. She is survived by her husband, Eugene, and six children. □

FOR SALE

BASEBALL, autographed by Reggie Smith, mint cond., \$50. 951-6880.
BASEBALL CARDS, Leaf set, 201 cards, major stars/rookies, Beckett value \$200, sell \$50; FOOTBALL CARDS, 200 assorted, major stars/rookies; Rice, Young, Favre, Aikman, E. Smith, Bledsoe, \$25. 626/914-6083.

BICYCLE, hand-made recumbent, P-38 Lightning, very lightweight, very fast, very comfortable, cost \$2,300, sell \$1,200. 626/836-8561.
BICYCLE, BMX-style, gd cond, foot brakes, \$40. 952-8455.

CAMP KITCHEN CABINET/TABLE, 32" w x 23" d x 9" h, wood box with removable legs, \$20. 626/355-6891.

CHAIRS, 2 recliners, like new, vg condition, \$100/ea. 951-3467.
CHILD'S CAR SEATS (2), vg condition, \$30 each; CAR SEAT/CARRIER, infant, vg condition, \$25; CHANGING TABLE, wood, Jenny Lind style, vg condition, \$20; HIGH CHAIRS (2), good condition, \$15 each. 805/259-8939, after 6 p.m.

CHILDREN'S ITEMS, Little Tikes: bookcase, table & chairs, bench/toy-box, rollerblades sz 1 & 2, make reasonable offer. 626/797-4758.

COMPUTER DESK, black, metal frame with tiered glass tops, excellent cond., \$150/obo. 323/259-8604, Traci.

COMPUTER DESK w/hutch, vinyl wood grain veneer, black shelves, lockable compartment, 50" x 28" x 60" high, gd. cond., \$60. 952-7408.

COMPUTER POWER CENTER, \$20. 790-3899.

COMPUTER, Pentium 75, 32MB RAM, 2GB HD, 17" monitor, CD ROM, Win 95, tons of software, great w/kids, \$300. 626/683-9331.

COMPUTER, complete home office, 486-DX2/66 PC w/16 MB RAM, 800 MB hard disk, color monitor, HP DeskJet 855C color printer, internal 33.6 fax modem, keyboard, mouse, Win 95 OS; includes MS Office, Netscape, etc. 626/683-7018.

COMPUTER, Mac laptop, PowerBook 1400cs/133; 24MB, 1.4 GB; Power PC 603e @ 133MHz; syst. 7.6.1; passive color matrix; ext. access.: 56K fax/modem; 10-key pad; optical mouse; carrying case, software & manuals; best offer. 985-0239.

COMPUTER, Toshiba Satellite 315CDT laptop, 200 MHz MMX, 2.2GB HD, active matrix 12" screen, 32 MB RAM, 56K modem, internal 24x CD + floppy drive, carrying case included, hardly used, exc. cond., \$1,500/obo. 909/987-4323.

CRIB, great cond., incl. mattress & bumper pad, \$60. 626/448-8809.

CRIB/MATTRESS, Simmons, exquisite, bleach white; great for new baby or extra for grandparents home; free delivery within 30 miles/San Dimas; \$475 new, sell for \$200/obo. 909/599-0710, Marc.

DESK, wood, simulated wood grain veneer, 3 drawers on left, 2 drawers on right, 60" x 30", exc. condition, \$50. 952-7408.

EXERCISE EQUIPMENT, NordicTrack Pro, with optional electronic monitor, good condition, see pic @ ERC, \$345. 952-7434.

FISHTANK, 55 gal., complete, incl. stand&filters, \$75/obo. 353-3323.

FURNISHINGS, merging two households, solid oak roll top desk, 5 bulb brass chandelier, two bookcases, rocker/glider chair, glass serving cart; all near new. 626/791-1266.

FURNITURE, rattan with blue/pink floral print; living room set: 6.6 foot couch, 4.5 foot couch, 2'x4' coffee table, 20"x28" end table, rocker chair; all for \$300/obo; indiv. prices avail. 626/568-8298.

GOLF CLUBS, women's, \$95; women's golf shoes size 9, \$20; recently used balls in gd cond. (you select), \$3/doz. 626/585-9632.
GOLF SET, jr., ages 9-13, bag, 2 woods, 3 irons, putter; \$99/obo. 951-6880.

HOCKEY TICKETS: indiv. Kings games, 2 Colonnade seats nr. blue line, includes Forum parking, \$60 (\$87 face value). 626/331-9998.
KILIMS, Persian, gorgeous 26" x 36" hand made, \$59. 360-3381.
LAMPS (2), brass, 5-foot, with shades; \$20/each, both for \$35/obo. 626/568-8298.

LAWN/MOWER, Sears, gas, power, \$20. 626/256-6242.

LOVESEAT, brand new, never used, off-white, won't fit in new house, \$250. 248-7033, Sandy.

MODEL AIRPLANES, radio control, by Carl Goldberg, Tiger 2 kit, \$60; Electra, fully built, \$50; K&B Sportster .45 engine, factory rebuilt, \$35; Sureflite Cessna 182 trainer built, \$50; Dave Brown Flight Simulator Ver 5, includes controller and CD-ROM with airplane library, \$60. 626/281-8195, Hugo or Frank.

MOVING SALE: bed, queen size, \$220; TV set, 25 x 27", \$140; office chair, \$60; two large tables (2 x 0.8m), \$25 each; vacuum cleaner, \$40. 626/796-2653.

ORGAN, Yamaha 415 electronic console w/13 pedals, 3 keybrds, 144 rhythm patterns, pd. \$7,500, sac. for \$3,000. 790-3899.

PALM PILOT, profess'nl, new in box, make offer. 714/535-2994.

PERSIAN RUG, gorgeous silk miniatures by a famous artist, 32" x 45", suitable for hanging on wall, \$1,085/obo. 360-3381.

PIANO, Wurlitzer upright, with bench, \$500. 952-8455.

Continued on page 8

PICTURE FRAMES, three made of brass, 22" x 28", \$10/each, \$21 for all three/obo. 626/568-8296.

PRINTERS, Epson FX-80 dot matrix, like new, \$39/obo; Epson LQ-510 dot matrix, like new, \$99/obo. 360-3381.

ROVERS, Mattel limited edition, 24K gold plated, mint in package, \$35. 626/791-0872.

SCANNER, UMAX 1200 S, exc. cond., comes w/original SCSI card, driver software included. 909/393-4089.

SOFTWARE, Microsoft Publisher 98 (\$49) Picture it (\$19); Word 97 upgrade, Eudora 4.0 or Adobe Photo Delux (\$19), never used hands-free kit for Nokia 2100 series cell phone (\$25); BATTERY, never used NiMH extended life for Nokia 6160/6190 (\$39); TREE, 6-foot fake ficus (\$19); CELL PHONE, Motorola, with case and charger (\$59). 366-6134.

SOFTWARE, for Mac, all \$25 and under. 790-3899.

SPA, Hot Springs portable, new \$2,800; like new, \$800. 626/355-5662.

SPEAKERS, utility, Advent, good cond., \$80/pair. 952-8455.

SPRINKLER VALVE actuators, Lawn Genie model 756LG3/4, new, \$10 each. 790-3899.

STEREO RECEIVER, Yamaha 100W/ch., built-in 5 band equalizer, remote, fantastic sound, exc. cond., \$99; DECODERS, Onkyo Dolby Prologic surround sound with center/rear channel amps, remote, \$99; Yamaha pre-amp, Dolby surround sound decoder, many a/v inputs, univ remote, exc. cond, \$79. 909/592-2279.

SWEATER, Coogi, from Australia, new, sells in Nordstrom for \$325, \$100. 790-3899.

TABLE, din. room, round, mahogany, sits 8 with two extensions, almost new, comes with 6 matching chairs, \$700/obo; matching China buffet, \$1,000/obo; all for only \$1,500/obo. 909/592-0780, Ana.

TABLE, dining room, + 6 chairs, pecan wood, round table has 1 leaf, opens to oval size, \$400/obo. 626/256-6242.

TABLE SAW, Ohio-Forge pro series, 10", \$150/obo. 626/256-6242.

VIDEO CAPTURE BOARD, for PowerMac; Pinnacle Systems/ Miro DC30 PCI for video capture and editing; incl. Adobe Premiere 4.2LE, manuals, cables, orig. box; \$400. 368-8649, Joe.

VIDEO GAME, Super-Nintendo set, system, 2 controllers, 7 games, exc. cond., \$49. 909/592-2279.

WETSUIT, O'Neil, exc. cond., fits child up to 5'11" and 85 lbs. 951-6880.

WINE RACKING, redwood, single-bottle depth, 6 ft. high by 12 ft. long, and 4 ft. high by 5 ft long; will also include chiller unit, \$500. 626/355-8706.

VEHICLES / ACCESSORIES

'95 CHEVY Corvette coupe, auto, metallic red, 38K miles, ext. warranty, new cond., \$22,500. 790-6738.

'90 CHEVY Lumina APV seven-passenger mini-van, loaded, only 55,000 miles; new breaks, newer tires, new battery; auto, ps, pw, pdl, a/c, cruise control, cassette, tilt; anti-theft device; excellent condition, original owner; \$6,899. 909/594-3935.

'92 CHRYSLER Town & Country minivan, 7 pass., all thr., power steering/windows/door locks, tilt wheel, a/c, cruise control, AM/FM stereo and cassette/CD player, anti-theft device, mag wheels w/good tires, exc. cond., \$9,000 firm. 626/797-9103.

'70 DATSUN 240Z service manual. 952-8455.

NOTICE TO ADVERTISERS

All housing and vehicle advertisements require that the qualifying person(s) placing the ad be listed as an owner on the ownership documents.

Universe

Editor

Mark Whalen

Photos

JPL Photo Lab

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Ads must be submitted on ad cards, available at the ERC and the Universe office, Bldg. 186-118, or via e-mail to universe@jpl.nasa.gov. E-mail ads are limited to six lines.

Ads are due at 2 p.m. on the Monday after publication for the following issue.

To change an address, contact your section's administrative assistant, who can make the change through the HRS database. For JPL retirees and others, call Xerox Business Services at (626) 844-4102.

'94 DODGE Ram Maxivan, power steering/windows/doorlocks, tilt whl., a/c, cruise, AM/FM ster./cass., gd tires, rear whl. ABS, trailer tow pkg. w/receiver and elect. brk., clean, exc. cond., \$9,000 firm. 626/797-9103.

'95 FORD F150 Lightning, black, 50,000 miles, great condition, will sell for what I owe on remainder of loan. 249-0573.

'91 FORD T-Bird, beaut. l cond., sacrifice, \$5,500. 626/578-7226.

'77 FORD F350 1-ton super cab utility truck, am/fm/cass./CD, new paint & tires. 714/535-2994.

'74 FORD Bronco, 307 V8, a, t, new tires, many extras, \$5,500. 805/266-2337.

'91 HONDA Accord LX, dark tan, 4 dr., auto, pwr. windows/doorlocks, am/fm/cass., air, more; only 24,800 mi.; \$9,800/obo. 626/395-6142, Terry.

'87 HONDA Accord, silver, manual, power steering, regular maintenance, 113,000 miles, runs great, \$2,600. 626/796-2653.

'87 HONDA Accord LX Gold, orig. owner, 4-dr., auto, a/c, p/s, pwr. locks/windows, cruise, alarm, 113k miles, good condition, passed smog test last December, \$3,750/obo. 626/568-8298.

'90 ISUZU Amigo, 2.6L, 4-wheel disc brakes, 31" tires, factory am/fm/cassette pull-out w/4 speakers, painted hard top with liner, \$5,300. 805/251-5616.

'86 MERCEDES 190E, auto, beige sedan, 4 dr., \$2,890. 790-3802.

'89 NISSAN Maxima SE, 4-dr. sedan, a/c, all power options, all scheduled maintenance complete (have receipts), exc. condition, new tires, new trans., silver/black, \$5,500/obo. 790-8069, after 5 p.m.

'96 PONTIAC Grand Am GT, 4-door sedan, white, 3.1 V6 UPG, all power, a/c, cruise control, premium wheels, ABS, alarm w/keyless entry, always garaged, clean, \$13,499. 626/447-1456.

'89 PONTIAC Grand Am SE, quad 4 eng., auto, a/c, power windows/locks, am/fm/cass., orig. owner, \$4,200/obo. 323/255-1106.

'88 SUBARU XT-6 coupe, loaded, 68K miles, needs shocks, runs excellent, make offer. 714/535-2994, Paul.

'94 TETON 5th wheel trailer, 40' Atlanta III, 3 slideouts, sbs fridge, conv. microwave, 2 a/c & furnaces, 2 roof fans, 7 kw Onan gen, HWH hydraulic lifters, awnings, no smoking, mint cond., in Palm Springs. 760/345-3713.

'95 TOYOTA Avalon, pearl white, loaded, tan leather inter., sunroof, CD, low mileage, like new, moving, \$19,000. 626/578-7226.

'90 TOYOTA Camry station wagon, V6, 77K miles, auto, a/c, am/fm/cass., cruise, pwr. doors/windows, orig. owner, exc. cond., \$6,900/obo. 909/592-2279.

'88 TOYOTA Celica GT convertible, vg shape, 5-speed manual, a/c, AM/FM/cassette, cruise control, power windows, custom-installed Viper alarm, 75K miles, \$6,380. 548-9151, Arlene.

'86 VW Golf, 2 door, 126,000 miles, not a luxury car but works fine, moving out, \$1,800. 626/356-0697.

'86 YAMAHA Venture 1300 motorcycle, runs perfect, looks good, 38,000 miles, \$4,000/obo. 895-3000.

WANTED

AQUARIUM, 20 to 40 gallon for pet snake; also need other accessories for snake: lamp, heat rock, etc. 952-8455.

PIANO, electronic keyboard, full-size keys, preferably touch sensitive and w/pedals. 952-8455.

RACQUETBALL PLAYERS: local, after work, club-b player. 845-8449, Ray.

ROOMMATE to share lg. 2-bd, 2-car gar., 2-1/2 ba. Pasadena townhome, 3-1/2 blocks so. of Old Town, central heat, a/c, fridge/washer/dryer/fireplace/patio, \$550 + 1/2 util. + dep. 626/577-4922, Ofelia.

ROOMMATE, single non-smoker to share 2-bd. house in Glenoaks Cyn. area of Glendale; great neighborhood close to all freeways, schools, etc., \$525. 310/826-3135.

SOFA/ARM CHAIR, 3-cushion, with ottoman in beige leather; good condition. 626/286-3705, Barbara Buckley.

SPACE INFORMATION/memorabilia from U.S., other countries, past/present. 790-8523, Marc Rayman.

VANPOOL RIDERS, #3, from Fontana Rancho Cucamonga, Upland, Claremont, La Verne area to JPL main facility. Ext. 4-8343, Mike Taylor or ext. 4-5831, Rhea Clearwater.

VANPOOL RIDERS, #30, Santa Monica/West LA; part-time or full-time riders, 2 convenient pick-up spots. Ext. 3-1139, Duane Bindschadler.

VOLLEYBALL PLAYERS, coed, all levels of play, Tuesday nights 8-10 at Eagle Rock High School, \$4/night. 956-1744, Barbara.

WORLD WAR II memorabilia, Allied and Axis, paying collector. 909/593-4348, Rick.

FREE

CLEAN FILL DIRT [mostly gravel like], you haul, several cu yds., as much as you like, 3 blks. ESE of NY/Hill, Altadena. 791-3103.

DOG, young female black lab mix; runaway, possibly abused, needs attention, very shy & sweet, I will spay and inoculate if you give her a home. 310/396-5927, Pat.

DOG, 1-year-old male Australian Shepherd, to good home, neutered and current on all shots, active and energetic, loves children, needs good-sized yard. 310/832-1099.

JARS, glass, wide-mouth, approx. 5 doz., incl. a few Mason-type. 790-0828.

MICROWAVE OVEN, works, but door latch needs fixing. 626/794-0081, Bonnie.

LOST & FOUND

Lost: PENDANT, silver Lapis, lost last month somewhere on Lab or in parking annex. Ext. 4-7828 or 249-1523.

Lost: GOLD CAMEO RING, man's, old, w/chip in cameo; Jan. 13, possibly inside a JPL mailing envelope, from shipping/receiving. Ext. 3-3076.

Found: SUNGLASSES, prescription, walkway/ramp below Bldg. 200, found Jan. 12, ~11:30 a.m. Ext. 4-6101, Tracee Wilks.

FOR RENT

ALTADENA room, unfurnished, \$320 + 1/3 util. 626/398-8109.

ALTADENA, charming 2-bd., 1-ba. house near Christmas Tree Lane; hardwood floors, fireplace, refrig., stove, washer/dryer, fenced backyard, fruit trees, roses; \$1,350, incl. water, gardener, trash; negotiable. 626/794-9579.

ARCADIA, furn., cozy rm, incl. kitch. privileges, laundry, pool, and 2 small loving dogs, no smoking, \$350. 626/448-8809, Shary.

ARCADIA (Upper), 1-bd. guest house, 655 sq' garb. disposal, washer/dryer, heater, a/c, all util. pd., priv. entr., \$850. 626/357-4849, Bob.

GRANADA HILLS, seeking 1 person to share lg. remodel. home; gardener, c/a, cable, frpl., hardw. flrs., pd., BBQ, new appliances, washer/dryer, spa, office; rm. has 2 windows, recessed lighting w/dimmers and att. bathrm; N. of Rinaldi, 20 min. from JPL; no smoking, no pets; \$495 + 1/2 utilities + deposit. 366-6134.

TUJUNGA, upper duplex, 2 bd., 1 ba., 2 patios, lovely view, stove & refrig., 20 min./JPL, \$650. 352-5608, Bobbie.

REAL ESTATE

BIG BEAR, new cabin 2 blocks from lake, 2 bd., 2 ba., mud/laundering room, \$129,000. 909/585-9026.

LA CANADA, vintage Tudor, prime loc., exc. schools, 4 bd., 2.5 ba., den, formal din. rm., dramatic living rm. w/vaulted ceiling, bay window, frpl., remodel. kitch., lots of wd. cabinets, sunny brfstarea, detached gar., hardwood flrs., skylights, appr. 2,100 sq. ft., lg. yd., brand new roof & paint, great cond., by owner, \$569,000/obo. 790-0375.

LA CANADA, walk to JPL, 2 bd., 1 1/2 ba., den/office, immaculate condition in/out, private yard with view, \$365,000, agt. 790-3508.

LA CRESCENTA home, 3 bd., 1.75 ba., family rm. w/frplc., central air/heat, Jacuz. w/gazebo, laundry rm, detached dbl. garage, great schools and neighborhood, \$287,000, agt. 409-1060, Mike.

NEAR DISNEYLAND, 6 bd., 2 ba., 2 story, with guest house and 7-car fenced parking lot. 714/535-2994.

PALM DESERT, 2 bd., 3 ba., den, separate din./liv. rms., on the golf course @ Palm Valley, 12' tile floors w/ bordered carpeting, marble fireplace, Corian kitchen/baths, mirrored walls, custom built-in wall units, \$299,000 furnished. 760/345-3713.

PALM DESERT, exquis., 2 bd., 2 ba. villa, vac. or long term, newly remodeled, w/skylight, patio & 2-car gar.; located acr. Living Desert, great priv., secure resort; tennis cts., multiple pools, spas, clubhouse facil.; great locale, around 2 top resorts. 909/620-1364.

YOSEMITE/MARIPOSA charmer on 2 wooded acres w/mtn. view, immaculate 2 bd., 1 ba., central forced heat & a/c, large decks, all appliances included, 2-car garage, excellent well, RV parking, room to add on, beautiful setting, perfect retirement or getaway home, \$117,000. 209/742-6735.

VACATION RENTALS

BIG BEAR, 7 mi. from slopes; full kitchen, f/p, 2 bd., 1 ba., sleeps 6; reasonable rates; 2-night minimum; no smokers, no pets; exc. hiking, biking, fishing nearby. 909/585-9026, Pat & Mary Ann Carroll.

BIG BEAR cabin, quiet area nr. village, 2 bd., slps. 8, compl. furn., F/P, TV/VCR, \$75/night. 249-8515.

BIG BEAR LAKE cabin, near lake, shops, village, forest trails, 2 bd., sleeps up to 6, fireplace, TV, VCR, phone, microwave, BBQ and more, JPL disc. price from \$65/night. 909/599-5225.

BIG BEAR LAKEFRONT lux. townhome, indoor pool/spa, nr. skiing, beaut. master bdrm. suite, slps. 6. 949/786-6548.

CAMBRIA, ocean front house, exc. view, sleeps up to 4, \$125/night for 2, \$175/night for 4. 248-8853.

CORNWALL, ENGLAND, Aug. '99 total solar eclipse; prime loc. campsite; incl. lecture series by Caltech, JPL and UK astronomers; <http://www.ctg-windows.co.uk/eclipse.html>. 626/356-2998.

HAWAII, Kona, on 166 ft. of ocean front on Keahou Bay, priv. house and guest house comfortably slp. 6; 3 bd., 2 ba., swim, snorkel, fish; spectact. vws., nr. restaur., golf, other attrac. 626/584-9632.

HAWAII, Maui condo, NW coast, on beach w/ocean vw., 25 ft. fr. surf, 1 bd. w/loft, compl. furn., phone, color TV, VCR, microw., dishwasher, pool, priv. lanai, slps. 4, 4/15-12/14 rate: \$95/nite/2, 12/15-4/14 rate: \$110/nite/2, \$10/nite/add'l person. 949/348-8047.

OCEANSIDE, on the sand, charming 1 bd. cond., panoramic view, walk to pier or harbor, pool, spa, game rm., sleeps 4. 949/786-6548.

MAMMOTH condo, 2 bd. + loft, 3 ba., slps. 8, spa, full kitch., TV/VCR, covrd prking; walk to Cyn Lodge; JPL disc. 249-8088.

MAMMOTH cond on Chamonix at lifts 7, 8, 16, 17; walk to Warming Hut, 2 bd., 2 full ba., slps. 6, fully eqpd. elec. kitch., microw., & extras, frplc/wood, color TV, VCR, FM stereo, o/d Jacz., sauna; gm., rec. & Indry. rms., walk to shops, lifts; spec. midwk rates. 249-8524.

MAMMOTH, Snowcreek, 2 bd., 2 ba., + loft; sleeps 6-8; fully equipped kitchen incl. microwave, D/W; cable TV, VCR, phone, balcony w/view to mtns., Jacuzzi, sauna, streams, fishponds; close to Mammoth Creek; JPL discount. 626/798-9222 or 626/794-0455.

PACIFIC GROVE house, 3 bd., 2 ba., fr. cable tv/vcr, stereo/CD, well-eqpd. kitchen w/microw, beaut. furn, close to golf, beaches, 17 Mile Drive, Aquarium, Cannery Row, JPL discnt. 626/441-3265.

PALM DESERT, exquis., 2 bd., 2 ba. villa, for vac. or long term, newly remodeled, w/skylight, patio & 2-car gar.; located across Living Desert, great priv., secure resort; tennis, pools, spas and clubhouse facil.; great locale, around 2 top resorts. 909/620-1364.

ROSARITO BEACH condo, 2 bd., 2 ba., ocean view, pool, tennis, short walk to beach on priv. rd., 18-hole golf course 6 mi. away, priv. secure parking. 626/794-3906.

S. LAKE TAHOE Keys waterfront home, 4 bd., 3 ba., slps. 12+, 2-lev. fireplaces, decks overlook, priv. dock/ski lifts, gourm. kitch., bikes, boats, color TVs, VCR, ster. w/tape/disk, pools, hot tub & bch.; tennis, 10 min./skiing, casinos/golf, 1 hr./wine cntry; \$995/wk. hi seas. [15 June to 15 Sept; 22 Nov. to 1 March]; + \$90 clean fee; 3-day min. 626/578-1503, Jim Douglas.